MARKA-SWEEP
1500-C

Kay Electric

OPERATING INSTRUCTIONS

MARKA SWEEP 1500C

SPECIFICATIONS

Sweep Modes: .01 - 750 Hz continuously variable, 60 Hz Line Lock, Manual, External, Single Sweep.

Sweep Direction: Hi - Lo, L0 - Hi

Sweep to Retrace Symmetery: Standard 4:1 (internally adjustable 4:1 to 1:4)

Sweep Output Amplitude: 8V p/p symmetrical around 0.

Markers: Pulse type or Birdie-pip type single or multiple at customer specified frequencies. Marker amplitude continuously variable to 8V pulse type and 8V p/p birdie-pip.

RF Output Impedance: #50 ohms standard,75 ohm optional.

Frequency Range: to 1 GHz - 50 ohms
500 MHz - 75 ohms

Attenuators: 0 - 60 DB in 10 DB steps
0 - 10 DB in 1 DB steps

Detector: Removable from rack, Frequency range - 1GHz (50 ohms)

OPERATING CONTROLS

Power OFF/Sweep Rate Fine - (Inner knob on Sweep Rate Switch) - controls power switch, OFF max. counter clockwise, continously varies sweep repetition rate over range selected by Sweep Rate Coarse control.

Sweep Rate Coarse - (Outer Knob) - Selects sweep repetition ranges and sweep modes - Manual, External, and Line Lock.

Single Sweep ON/OFF - Switch - selects either continuous or single sweep operation. In the ON position the sweep circuits are set to provide a single sweep at the speed selected by the Sweep Rate controls, when the Single-Sweep Push switch is held down. The direction of the single sweep is switchable with the +/- Single Sweep Switch located on the chassis rear

Single Sweep Push Switch - This switch is pushed and held down to obtain a single sweep. The sweep will commence when the switch is pushed and continue until it reaches the end of its excursion as long as the switch is held down. The sweep retrace will occur only after the switch has been released. This feature is particularly useful when used in conjunction with X-Y recorders where a slow single sweep is required.

Sweep Width - This control provides for continous variation of the sweep width. ($\triangle$F)

RF Attenuator - provides for attenuation of the RF output level by switchable, additive, fixed 1 db or 10 db steps.

Blanking ON/OFF Switch - Selects either a blanked output, a zero reference line on the retrace portion of the sweep or an unblanked output with RF output on both the sweep and retrace portion of the sweep time.

Sweep Normal/Reverse - Selects the direction of the sweep trace. In the Sweep Normal position the direction is from high to low RF frequency and in the Reverse position on it is from low to high frequency.

Manual Sweep- (dual control) - Inner-Coarse outer-Fine: When the Sweep Rate Coarse control is in the Manual position this control provides for adjustment of the RF signal frequency and the sweep sawtooth voltage over the range developed in the sweeping conditions.

Pulse Marker Level/Adj. (Dual Control) Inner Adj, Outer Level -The Pulse Marker Adj. control sets the firing point of the pulse generator. It should be set so that the pulse marker appears as a single pulse. The Pulse Marker Level adjusts the amplitude of marker pulse. EXTERNAL MOD SOCKET.

Birdie Marker Level -This connector provides a means by which an external signal can provide the sweep voltage for the oscillator and scope drive. When the Coarse Sweep Rate control is set to EXT. For a normal sweep excursion the external signal amplitude should be ± 6V around ground from DC to approx. 2 KHz.

Sweep Out. - This connector provides the sweep voltage for the oscilloscope horizontal drive.

RF Out. - Provides the RF output signal at a characteristic impedance of 50 ohms. If the input impedance of the unit under test differs substantially from 50 ohms an impedance matching device should be connected between the RF Out connector and the device under test.

Vert. Out. - This connector provides the output from the RF detector and the marker signals. It is normally connected to the scope vertical input. If an external detector is used the detected output and the marker signals from the Vert. Cut. connector should both be connected to the vertical scope input, preferably thru separate channels to prevent loading.

Detector In. - If the sweep signal is beyond the frequency limitations of the oscilloscope it is necessary to apply these signals to a detector before connecting them to the scope. The RF may be connected to the Detector In. connector or the detector may be removed from the rack by twisting in a counter-clockwise direction and pulling out. If used externally, the output of the detector should be connected to the scope vertical input.

Internal Controls - +150V Adj - Sets the High voltage regulated power supply for +150 volts output.
+30V Adj - Sets +30V regulated power supply
-30V Adj - Sets -30V regulated power supply.

Single Sweep Start Position - Sets the starting point of the single sweep trace. It is normally set to same starting position as continuous sweep as noted on oscilloscope. This control requires readjustment if the Single Sweep polarity is reversed by switching the Single Sweep polarity switch or if the sweep symmetry is readjusted.

Line Lock Adj. - This control locks the Line Lock frequency to 60 cycles. It should be set so that the frequency is locked at 60 cycles and the sweep sawtooth amplitude is equal to that of the variable sweep ranges. This control will require readjustment if the sweep symmetry pot is reset.

Sweep Sym. - This control sets the ratio of the sweep to retrace time. It is normally set so that the sweep time is 4 times the retrace time. This control can be set for any ratio from 4:1 thru 1:1 to 1:4. When changes in this control are made it maybe necessary to reset the Line Lock and the Single Sweep Start Position controls.

OPERATING INSTRUCTIONS

1. See that the Sweep and Marker plug-in heads are seated firmly in the rack.

2. Connect the Swp. Out connector to the scope Horizontal input.

3. Connect the Vert. Out connector to the scope Vertical input.

4. Connect RF Out connector to device under test using impedance matching circuit where neccessary.

5. Connect output of device under test to scope vertical input or to detector input if necessary All lead lengths should be as short as possible. line cord to 115V AC.

6. Turn Power ON. A lamp located behind the RF Output Meter will light, indicating that the instrument has been energized.

7. Set the "Coarse Sweep Rate" control for optimum sweep repetition rate. Normally, Line Lock is used for wide sweep width operations with slower rep. rates being used for narrow sweep widths or sweeping thru circuits having high Q factors.

8. Set Center Frequency of sweep with frequency controls on sweep plug-in head. (See sweep head instruction manual).

9. Set Sweep Width control for best ΔF range (normally approx. 3 times the band pass of device under test.

10. Set RF output level with fixed attenuator steps on the rack and variable RF Level control on the sweep head. The level should be set so as not to overload the device under test. The RF Level Output meter indicates the amplitude of the RF signal into the fixed attenuators. The actual output level must be calculated from the values of fixed inserted attenuation. The meter is calibrated for Line Lock operation and some meter error will appear at other repetition rates and operating modes.

11. Markers - (See Marker Plug-In Head instruction manual) - For pulse type markers set Marker Adj. control so that a single pulse appears for each crystal marker and set marker amplitude with Pulse Marker Level control.
    For birdie-pip markers adjust level with Birdie Mark Level control.

{STD UNIT.}

MARKER SECTION
J1

SWEEP SECTION
J2

+30V -30V +150V 6.3AC 117V

PULSE WIDTH

PULSE SHAPE

S1 A

S1 B

MIN FOR FIRING 440MV

MIN TRIG -2.5V PEAK

Q201 MA710C SCHMITT TRIGGER

PULSE MARK AMP

Q204 2N3568 PULSE MARKER EMITTER FOLLOWER

PULSE MARK LEVEL (EXT)

PULSE MARKER ADJ (EXT)

PULSE GEN ADJ (INT)

Q202 2N3568 PULSE GEN

Q203 2N3568 PULSE GEN

P/C/B 10033

P/C/B 10034

BIRDIE MARK AMP

BIRDIE MARKER LEVEL (EXT)

Q205 2N3565 BIRDIE MARKER AMP

Q206 2N3565 BIRDIE MARKER AMP

P6 105-130 V AC

POWER OFF (EXT)

S2

F1 3 AMP

C1 4000

C2 4000

C4 .01

C5 4000

L1 1mh

L2 1mh

I1 6.3V 2 AMP

TRANS KP 9447

T1

P/C/B 10033

Q1 2N3055

Q101 40318

Q2 40318

Q3 40318

+150V ADJ (INT)

Q4 40250

Q102 2N3568

Q103 2N3569

Q104 2N3569

Q105 2N3569

+30V ADJ (INT)

Q5 40250

Q106 2N3568

Q107 2N3569

Q108 2N3569

Q109 2N3569

-30V ADJ (INT)

M1 OUTPUT METER 200 μA

SAWTOOTH GEN

Q207 SYNC LOCK 2N3568

Q208 2N1308

Q209 2N1308

SE 4002 Q210

2N 3638A Q211

Q212 2N3638A

Q213 2N3638A

Q214 2N1308

SWP SYM (INT)

SINGLE SWP (EXT)

SINGLE SWP START POSITION (INT)

SINGLE SWP POLARITY [INT]

HOLD

ZERO SYM (INT)

J3 SWEEP OUT

R5 SWP WIDTH (EXT)

Q215 2N3568 EMITTER FOLLOWER

BLANKING S2

2N3638A BLANKING AMP Q216

S-3 SWEEP NOR/REV

FUNCTION SELECTOR

MAN AUTO

S-8

R6 5M LINE LOCK (INT)

MEG SWP RATE (EXT)

LINE LOCK

EXT SWP

J4

P/C/B-10034

DETECTOR 100 KHZ - 1GHZ

D301 IN416B

J5 P5

J6 DET IN

J7 VERT OUT (EXT)

J8 MARKER RF IN (INT)

J9 MARKER RF OUT (INT)

J10 RF OUT (INT)

ATT 0-60 DB

ATT 0-10 DB

J15 RF OUT (EXT)

MARKER SECTION

SWEEP SECTION

NOTE:

PARTS WITH NUMBERS IN 100 SERIES LOCATED ON PCB 10033
PARTS WITH NUMBERS IN 200 SERIES LOCATED ON PCB 10034
PARTS WITH NUMBERS IN 300 SERIES LOCATED IN DETECTOR
ALL OTHER PARTS LOCATED ON CHASSIS OR PANEL

AUA1705

SCHEMATIC-RACK	MARKA-SWEEP 1500C
MAT.	FINISH:
	SCALE:

DIMENSION TOLERANCES UNLESS OTHERWISE SPECIFIED.
DECIMAL DIMENSIONS ± .005 FRACTIONAL DIMENSIONS ± 1/64

CHANGE	DATE	APP.
"D" CIRCUIT ONE IN 02 APPR; CHANGE VALUE IN STD NUMBER C RES R 20, R 141, R142 NOW R145, R143, R144, R266	7-14-67	LT
D D203 WAS D 202 SPEC. R248 R252 R254 WERE R248 R252 R254	7-14-67	LT
E PER ECN 68 1711	7-19-67	LT
F FIXED FINGER ON SHIELD PER ECN 1178, REVISED FINGER LOCATION PER ECN 1127	8-17-67	DP
G R215-15K WAS 27K, R221-2.2K WAS 47K PER ECN 1189	9-11-67	LT
H ADD PINS 112 & 31 COMP, R23, R18 AND R244 PER ECN 1208	9-26-67	LT
J R 20 & 21 WERE TYPE MUSTY PER ECN 1268	11-1-67	LT

KAY ELECTRIC CO.
PINE BROOK, N. J.

DWN. BY APP — DATE 5-6-67
APP. BY H THEN — DATE 6-6-67

DWG. NO. D 9964 J